e. Plot these parametric equations on graph paper, using each integer value of t from -3 to 3. Confirm the results by plotting on your grapher. Is y a function of x? Explain.

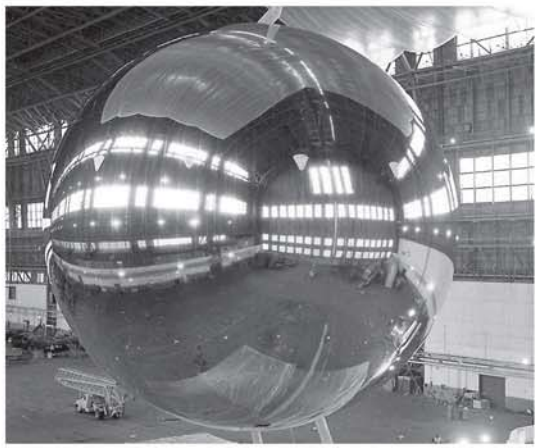
$$x = 3 + \left|4 - t^2\right|$$
$$y = t + 4$$

f. *Spherical Balloon Problem:* The table shows the volume of a spherical balloon, $v(x)$, in cubic meters, as a function of its radius, x, in meters.

x (m)	$v(x)$ (m^3)
0.2	0.3
0.4	0.27
0.6	0.90
0.8	2.14
1.0	4.19

Plot function v on graph paper by plotting $y = v(x)$ for these points and connecting the points with a smooth curve. What evidence do you have that function v is invertible?

Plot the graph of $y = v^{-1}(x)$ on the same axes. What is the difference in the meaning of x as the input for function v and x as the input for function v^{-1}? Explain why $v^{-1}(v(x))$ equals x.



Echo 1, the first communication satellite developed by NASA, was a giant metal balloon that floated in orbit. It was used to bounce sound signals from one place on Earth to another.

g. Sketch the graph of a one-to-one function. Explain why it is invertible.

R6. a. On four copies of $y = f(x)$ in Figure 1-8k, sketch the graphs of these four functions: $y = -f(x)$, $y = f(-x)$, $y = \left|f(x)\right|$, and $y = f\left(\left|x\right|\right)$.

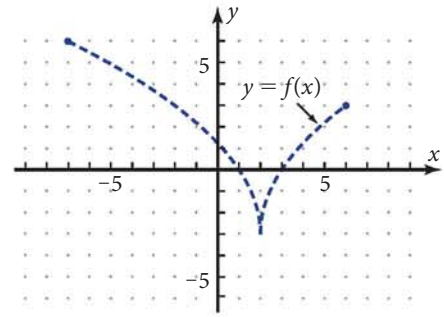


Figure 1-8k

b. Function f in part a is defined piecewise by

$$f(x) = \begin{cases} 3\sqrt{x-2} - 3 & 2 \le x \le 6 \\ 3\sqrt{2-x} - 3 & -7 \le x \le 2 \end{cases}$$

Plot the two branches of this function as $f_1(x)$ and $f_2(x)$ on your grapher. Does the graph agree with Figure 1-8k? Plot $y = f\left(\left|x\right|\right)$ by plotting $f_3(x) = f_1(x)$ and $f_4(x) = f_2(x)$. Does the graph agree with your result in the corresponding portion of part a?

c. Explain why functions with the property $f(-x) = -f(x)$ are called *odd* functions and functions with the property $f(-x) = f(x)$ are called *even* functions.

d. Plot the graph of

$$f(x) = 0.2x^2 - \frac{\left|x-3\right|}{x-3}$$

Use a window that includes $x = 3$ as a grid point. Sketch the result. Name the feature that appears at $x = 3$.

R7. In Section 1-7 you started a precalculus journal. In what ways do you think keeping this journal will help you? How could you use the completed journal at the end of the course? What is your responsibility throughout the year to ensure that writing the journal has been a worthwhile project?